

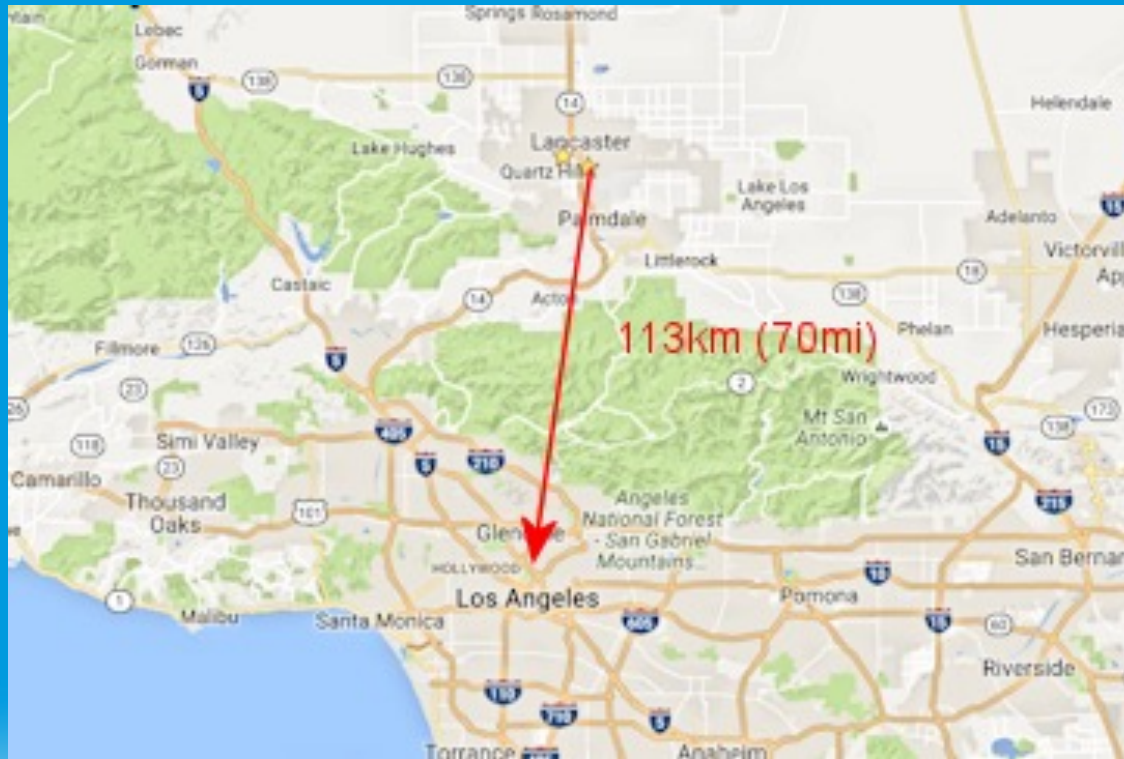
Living the Dream!

Len Engel, Executive Director/CEO
Antelope Valley Transit Authority
Lancaster, California USA

Habitat III – Quito, Ecuador
October 19, 2016



Where is the AV?





Full *Green* By 2018

Pilot Program

Data, Data, Data

What will our fleet look like past 2018

How will we run them on route all day?

Training

Convert the parts room

Procure 2 BYD 40' Battery Electric Bus's

Collect Incredible Amounts of Data

50 local & 35 Commuters

Charging Infrastructure

Operators and Technicians

say goodbye to diesel parts!!!



Life as we know it -- *Success!*



- ☀️ Two 40' WAVE Ready BYD 40' battery electric buses available for service 90%
- ☀️ Average range 250-290km (1.3kw-1.1kw/km)
- ☀️ 24,000 km between service interruptions
- ☀️ Average Cost Per Mile including Maintenance and Electricity \$0.61



So Far...

\$48.3M Project

\$28.9M California \$7.9M USA \$11.5M AVTA

13 – 60' Battery Electric Articulated Buses

16 – 45' Battery Electric Commuter Coaches

10 – 40' Battery Electric Transit Buses

11 – Primary 250+kw inductive chargers

34 – Secondary "receivers" (on the bus)



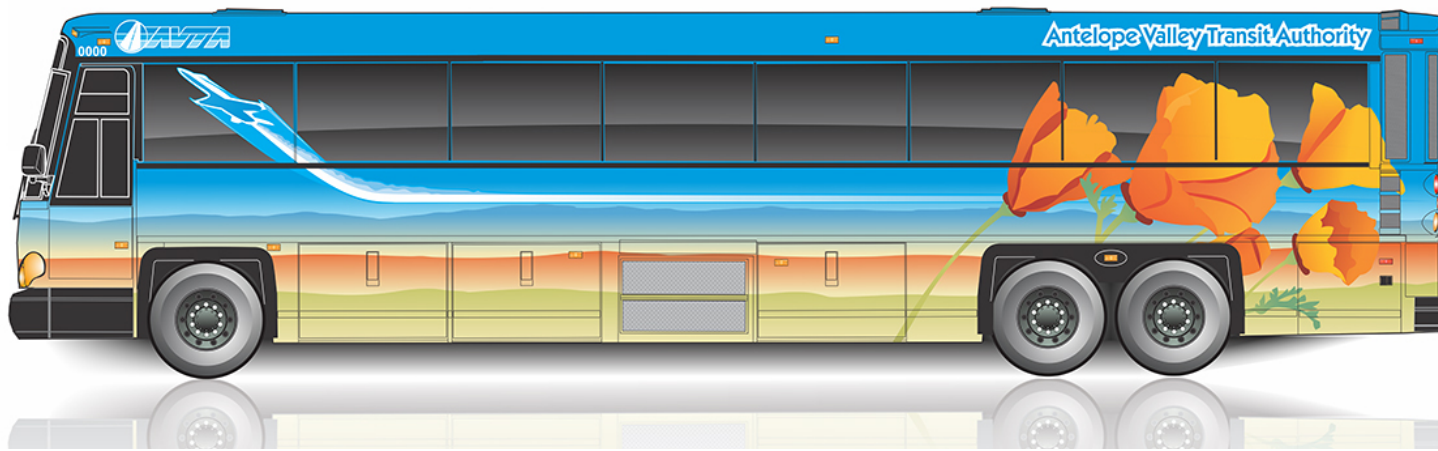
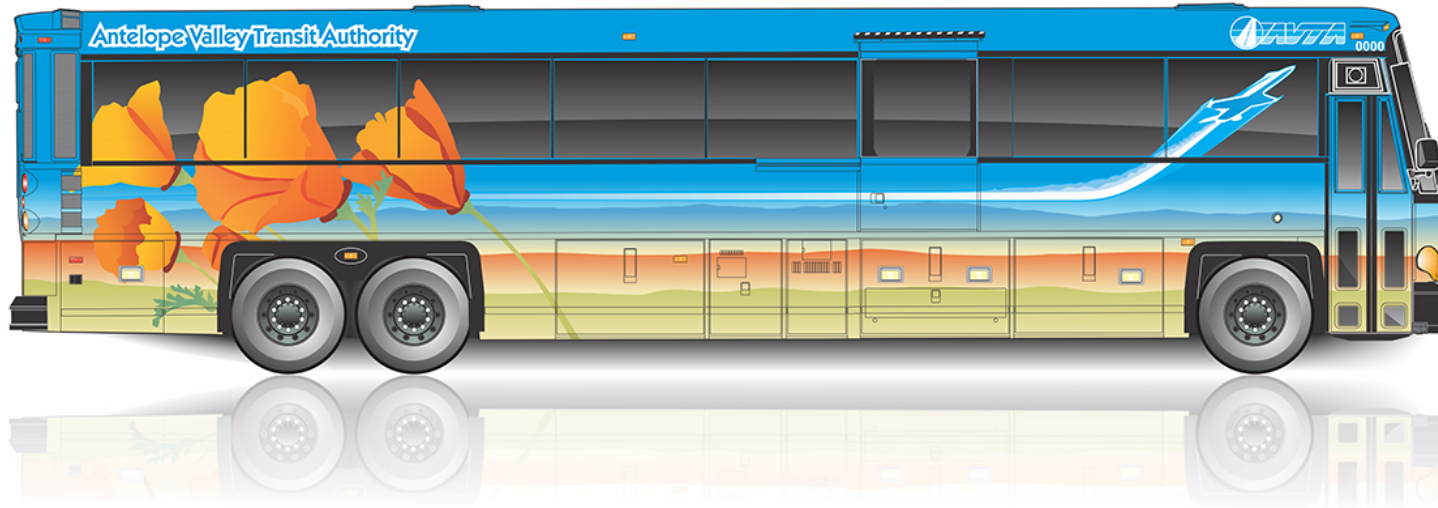
February 2016

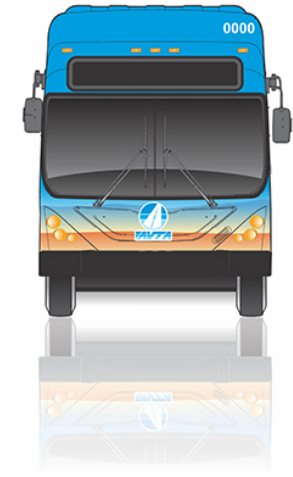
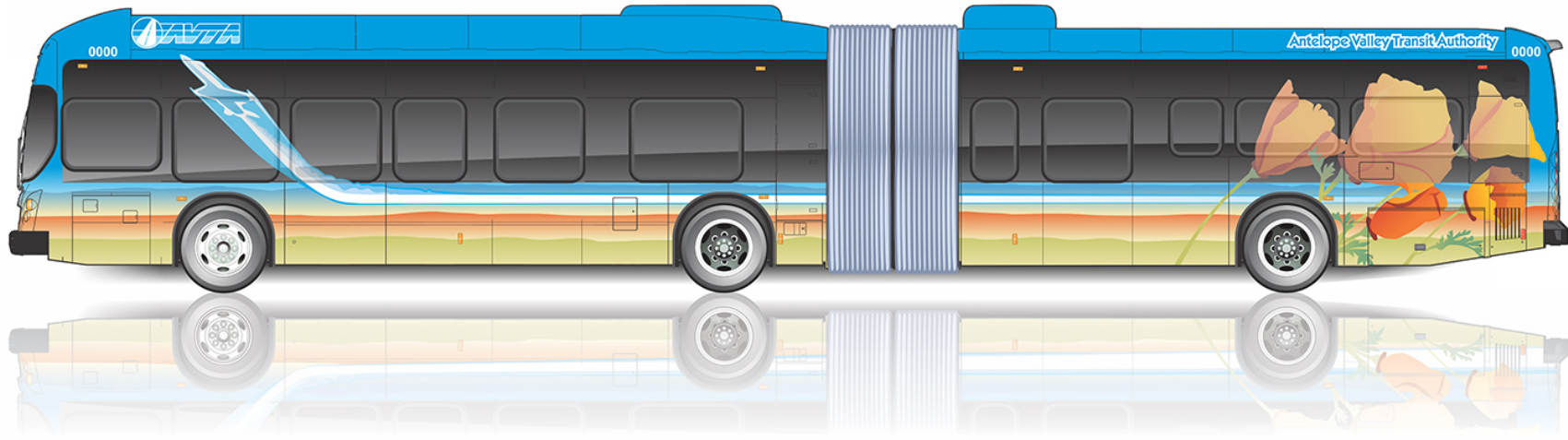
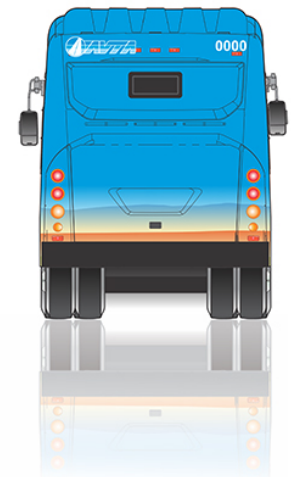
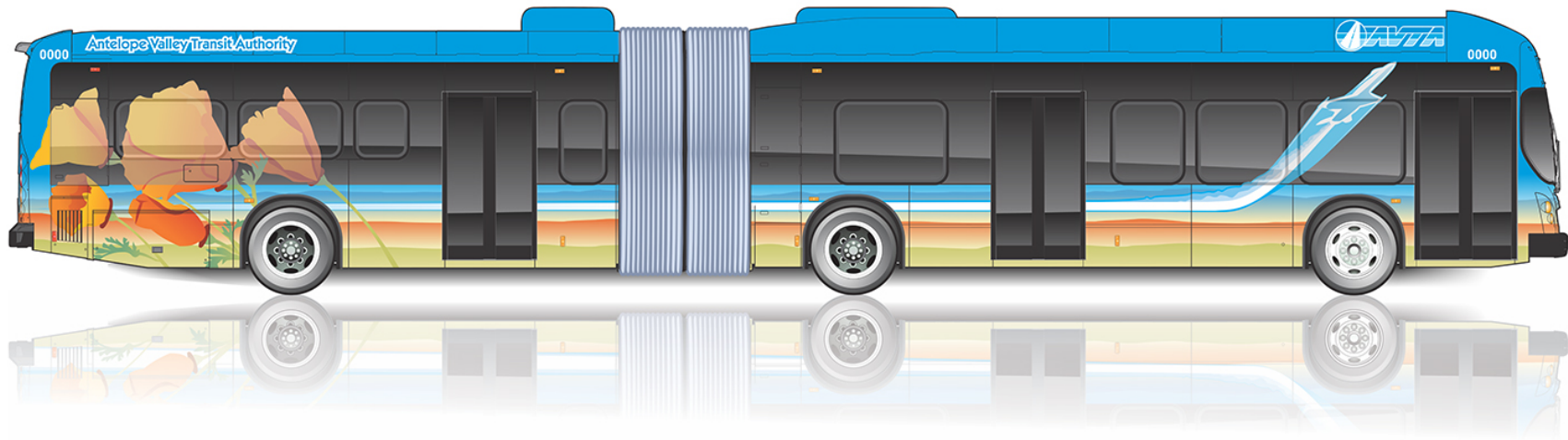
- **AVTA Awarded a contract for 85 Battery Electric Buses to BYD America**
- 35 – 45' battery electric commuter coaches.
- 14 – 60' battery electric articulated buses (BRT).
- 36 – 40' battery electric transit buses.





COMMUTER COACH





Charging Infrastructure

- Four inductive chargers at each of our transit centers
 - Palmdale Transit Center and Lancaster City Park.
 - AVTA will supply energy for the LCP chargers.
- Current plan calls for additional chargers near 47th East and Ave S and Lancaster Metrolink Station.
- 85 positions for depot charging.



Inductive/Opportunity Charging

250kWh Chargers

324kW - 10min Charge = 32km of range

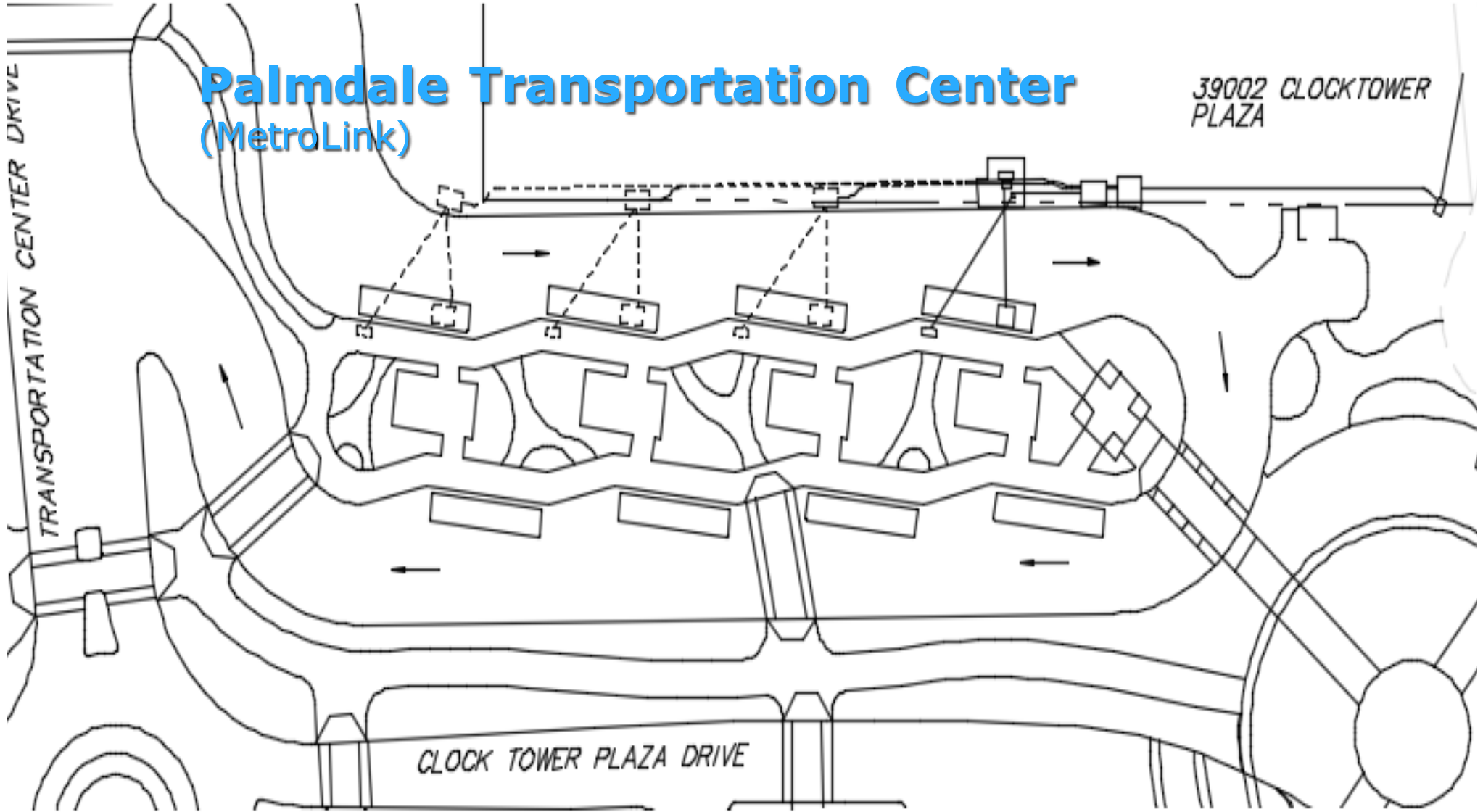
12 trips/day = 384km of range extension

290+384=638 potential km range (425mi)



Palmdale Transportation Center (MetroLink)

39002 CLOCKTOWER
PLAZA



TRANSPORTATION CENTER DRIVE

CLOCK TOWER PLAZA DRIVE

Depot Charging

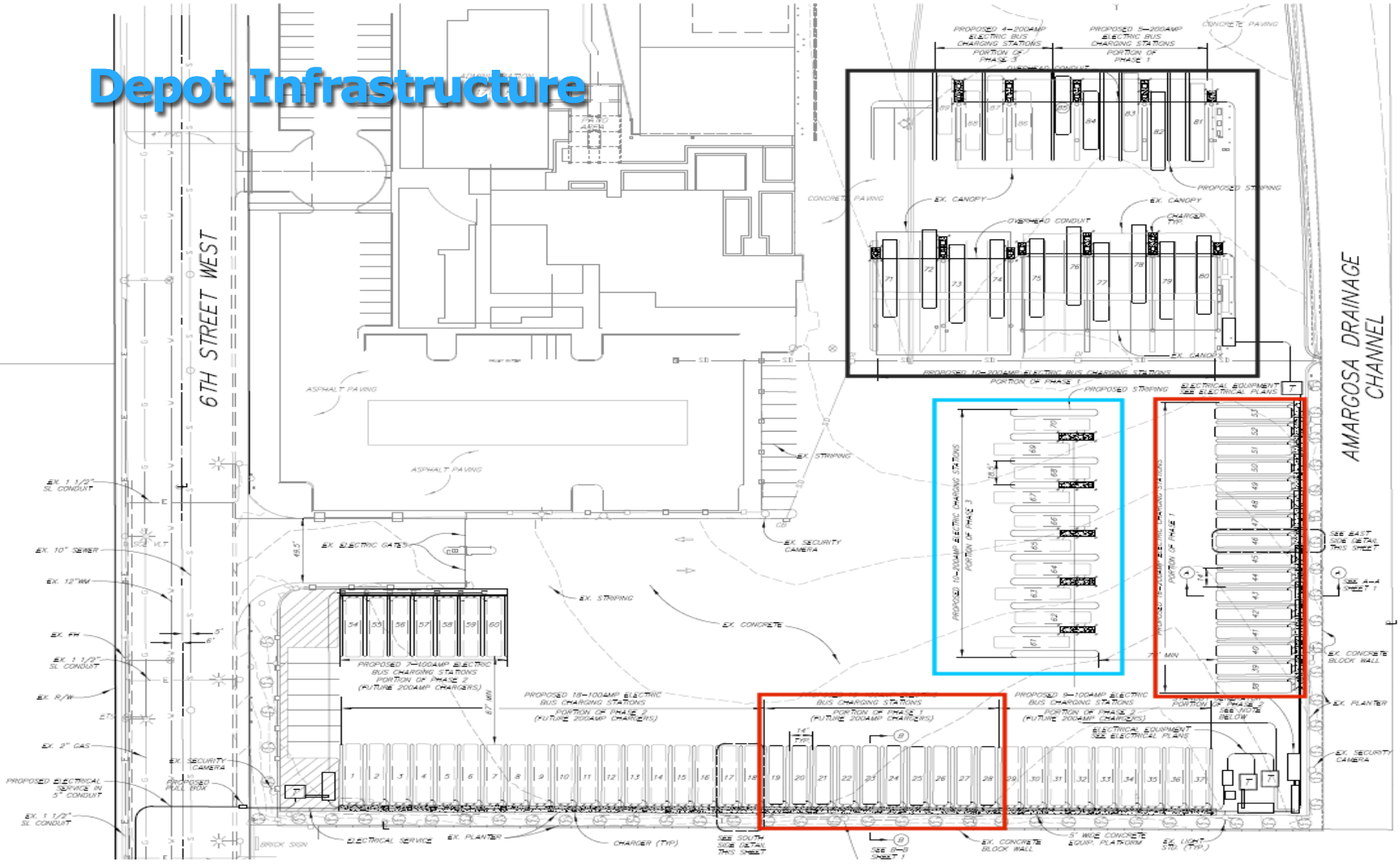
85 Power Transfer Units	49-200A / 36-100A
Energy Required Daily	12,500V / 40,500kW
Peak Available	12,500V / 10,000A
Controlling Peak Energy	E.L.M.S.
Monitor SOC/ Energy Consumption	H.A.M.S.
Monitor Performance	H.A.M.S.





Depot Charging Area

Depot Infrastructure





Monitoring Technology

Automate Data Collection

Export data to reporting software

Control energy grid peak demand limits

Export data to key staff

Notify staff of any charging malfunctions

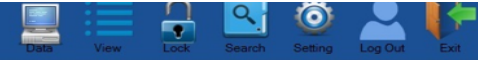
Live data for training and performance

Charge at key times for lower energy rates



Electrical Load Management System

I/O Controls



Max Vehicle: 3
Max SOC (%): 100
Max Current(A): 500
Total Current(A): 0
Start: 2016-03-11 09:00:00
End: 2016-03-11 19:00:00
Running Days: 1

Vehicles: 10

Charging	1	2001	51.2%	L	R	O
Alert	1	2002	76.8%	L	R	O
Waiting	0	2004	51.2%	L	R	O
Pause	0	2005	76.8%	L	R	O
Complete	1	2003	100%	L	R	O
Disconnect	7	2006	---	L	R	O
		2007	---	L	R	O
		2008	---	L	R	O
		2009	---	L	R	O
		2010	---	L	R	O

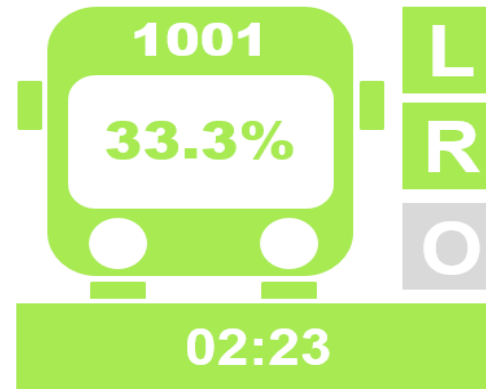
Charging

Alert

Waiting

Pause

Complete



Left charge gun

Right charge gun

Override switch

Disconnected

Run Tips

9:14:12 AM 001840 S 2002
9:14:12 AM 001840 S 2001
9:14:12 AM 001840 R 2003 87
9:14:15 AM 001842 R 2002 87
9:14:15 AM 001842 R 2001 88
9:14:15 AM 001842 S 2003
9:14:18 AM 001843 S 2002
9:14:18 AM 001843 S 2001
9:14:18 AM 001843 R 2003 87
9:14:21 AM 001846 R 2002 87
9:14:21 AM 001846 R 2001 97
9:14:21 AM 001846 S 2003
9:14:24 AM 001847 S 2002
9:14:24 AM 001847 R 2003 87
9:14:27 AM 001848 R 2002 87
9:14:27 AM 001848 S 2003
9:14:30 AM 001849 S 2002
9:14:30 AM 001849 R 2003 87
9:14:33 AM 001850 R 2002 87
9:14:33 AM 001850 S 2001
9:14:33 AM 001850 S 2003

8:50:16 AM S
8:50:20 AM S
8:50:22 AM S
8:50:24 AM S
8:50:28 AM S
8:50:28 AM S
8:50:29 AM S
8:50:29 AM S
8:50:29 AM S
8:50:29 AM S
8:50:30 AM @
20:F8:5E:B5:F9:B0=2001
8:50:30 AM S
8:50:32 AM S_Error
8:50:33 AM --- Colsed
8:50:33 AM @
20:F8:5E:B9:58:71=2003
8:50:34 AM S_Error
8:50:34 AM S_Error
8:50:35 AM --- Colsed
9:00:50 AM Settings changed
9:05:50 AM Settings changed
9:14:16 AM Settings changed

Time 3/11/2016 9:14:32 AM Local IP 192

If the bus has no alert or charging complete, **Alert** and **Complete** automatically hide.





Come Visit!

